

COLUMBINE LOGGING

Scale: 5" / 100'
Measured Depth Log

Well Name PAPPENHEIM 6-62-27-0108BH VERT

Location SEC 27-T6N-R62W

State COLORADO

County WELD

Country USA

Rig Number CADE 24

API Number 05-123-37220

Region DENVER-JULESBURG BASIN

Field NE WATTENBERG

Spud Date 5/14/2013

Drilling Completed 5/26/2013

Surface Coordinates 1302' FNL 205' FWL

Bottom Hole Coordinates NENE SEC 27-T6N-R62W
650' FNL 620' FEL

Ground Elevation 4750

K.B. Elevation 4765

Logged Interval 4,000 To 10918

Total Depth 10918

Formation NIOBRARA B2

Type of Drilling Fluid SPUD

Operator

Company BILL BARRETT CORPORATION

Address 1099 18th Street, Suite 2300
Denver, CO 80202

Geologist

Name Jason Brand

Company Bill Barrett Corporation

Address 1099 18th Street, Suite 2300
Denver, CO 80202

Other

Rock Types

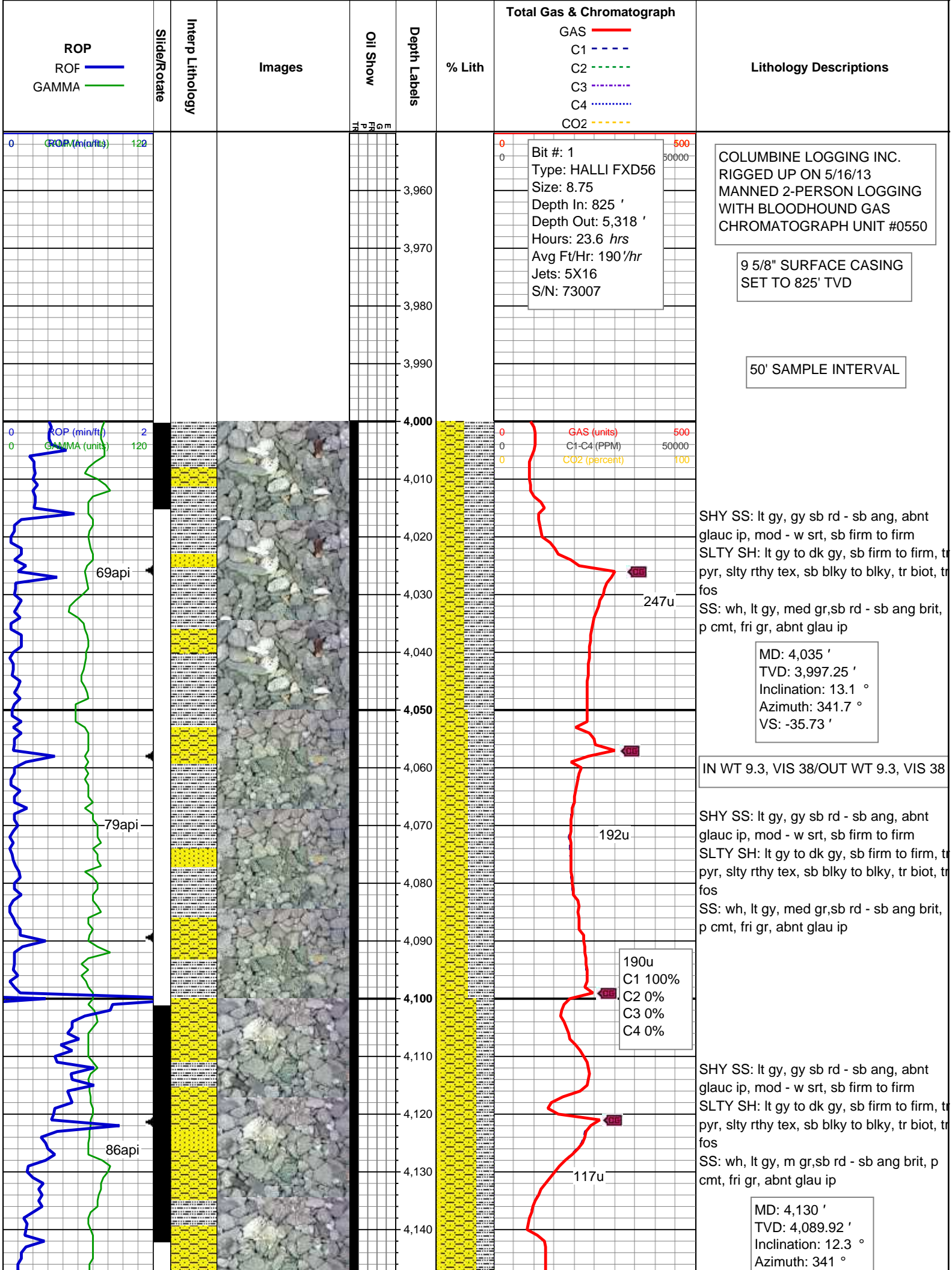
UNKNOWN	COAL	METAMORPHIC	SHALY SILTSTONE
ANHYDRITE	CONGLOMERATE	NO SAMPLE	SILTSTONE
BENTONITE	DOLOMITE	SALT	SILTY SHALE
BRECCIA	GRANITE	SALT- PEPPER SAND	TILL
CEMENT	GYPSUM	SANDSTONE	TUFF
CHALK	IGNEOUS	SHALE	WELDED TUFF
CHERT	LIMESTONE	SHALE COLORED	
CLAY CHOKESAND	SIDERITE or LIMONITE	SHALE GRAY	
CLAYSTONE	MARLSTONE	SHALY SANDSTONE	

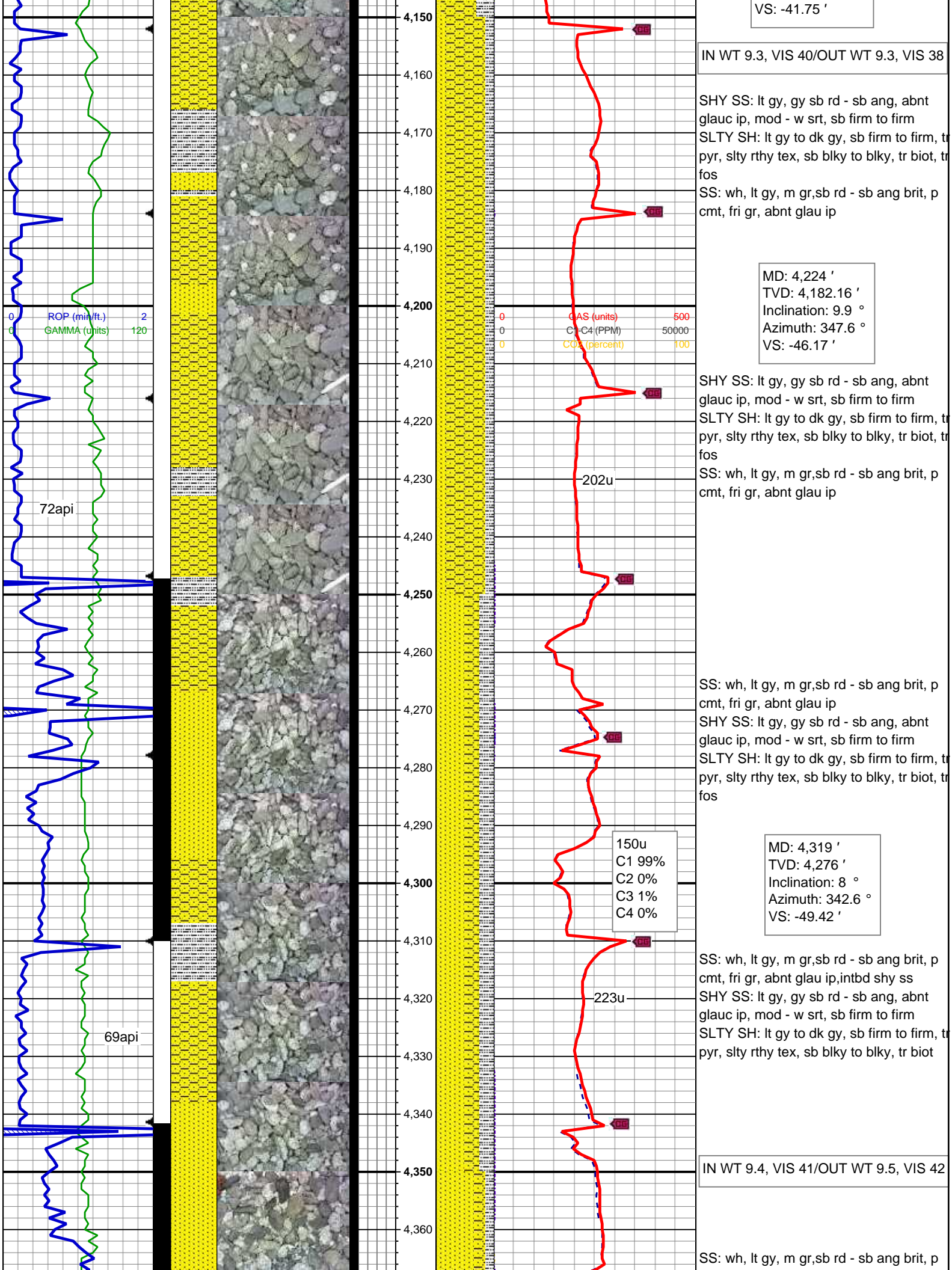
Accessories

Fossils	F FOSSIL	ANHYDRITIC	FERRUGINOUS	Stringer
ALGAE	GASTROPOD	ARGILLACEOUS	GLAUCONITE	ANHYDRITE STRINGER
AMPHIPORA	INOCERAMUS	ARGILLITE GRAIN	GYPSIFEROUS	BENTONITE STRINGER
BELEMNITE	OOLITE	BENTONITE	HEAVY MINERAL	COAL STRINGER
BIOCLASTIC	OSTRACOD	BITUMENOUS SUBSTANCE	KAOLIN	DOLOMITE STRINGER
BRACHIOPOD	PELECYPOD	BRECCIA FRAGMENTS	MARLSTONE	GYPSUM STRINGER
BRYOZOA	PELLET	CALCAREOUS	MINERAL CRYSTALS	LIMESTONE STRINGER
CEPHALOPOD	PISOLITE	CARBONACEOUS FLAKES	NODULES	MARLSTONE (CALC) STRG
CORAL	PLANT REMAINS	CHTDK	PHOSPHATE PELLETS	MARLSTONE (DOL) STRG
CRINOID	PLANT SPORES	CHTLT	PYRITE	SANDSTONE STRINGER
ECHINOID	SCAPHOPOD	COAL - THIN BEDS	SALT CAST	SHALE STRINGER
FISH	STROMATOPOROID	DOLOMITIC	SANDY	
FORAMINIFERA	Minerals	FELDSPAR	SILICEOUS	
		FERRUGINOUS PELLETT	SILTY	SILTSTONE STRINGER

Other Symbols

Oil Show	MOLDIC	FAULT	WIRELINE TESTED - LEFT	E EARTHY
DEAD	ORGANIC	FORMATION TOP	WIRELINE TESTED - RT	FX FINELYXLN
EVEN	PINPOINT	GAS SHOW		GS GRAINSTONE
QUESTIONABLE	VUGGY	MN DEPTH	Rounding	L LITHOGRAPHIC
SPOTTED STAINING	Engineering	NORMAL FAULT	ANGULAR	MX MICROXLN
Porosity	BIT	OIL SHOW	ROUNDED	MS MUDSTONE
E EARTHY	CONNECTION (LEFT)	OVERTURNED STRATA	SUBANG	PS PACKSTONE
FENESTRAL	CONNECTION (RIGHT)	REVERSE FAULT	SUBRND	WS WACKESTONE
FRACTURE	CONNECTION GAS	SIDEWALL CORE (LEFT)	Textures	Sorting
INTERCRYSTALLINE	CORE - LOST	SIDEWALL CORE (RIGHT)	BOUNDSTONE	M MODERATE
INTEROOLITIC	CORE - RECOVERED	SLIDE	CHALKY	P POOR
	DST INTERVAL	SURVEY	CRYPTOXLN	W WELL
		TRIP GAS		





VS: -41.75'

IN WT 9.3, VIS 40/OUT WT 9.3, VIS 38

SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr biot, tr fos
 SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr, abnt glau ip

MD: 4,224'
 TVD: 4,182.16'
 Inclination: 9.9°
 Azimuth: 347.6°
 VS: -46.17'

CLOG (percent) 100
 C1-C4 (PPM) 50000
 CLOG (percent) 100

SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr biot, tr fos
 SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr, abnt glau ip

202u

72api

SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr, abnt glau ip
 SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr biot, tr fos

150u
 C1 99%
 C2 0%
 C3 1%
 C4 0%

MD: 4,319'
 TVD: 4,276'
 Inclination: 8°
 Azimuth: 342.6°
 VS: -49.42'

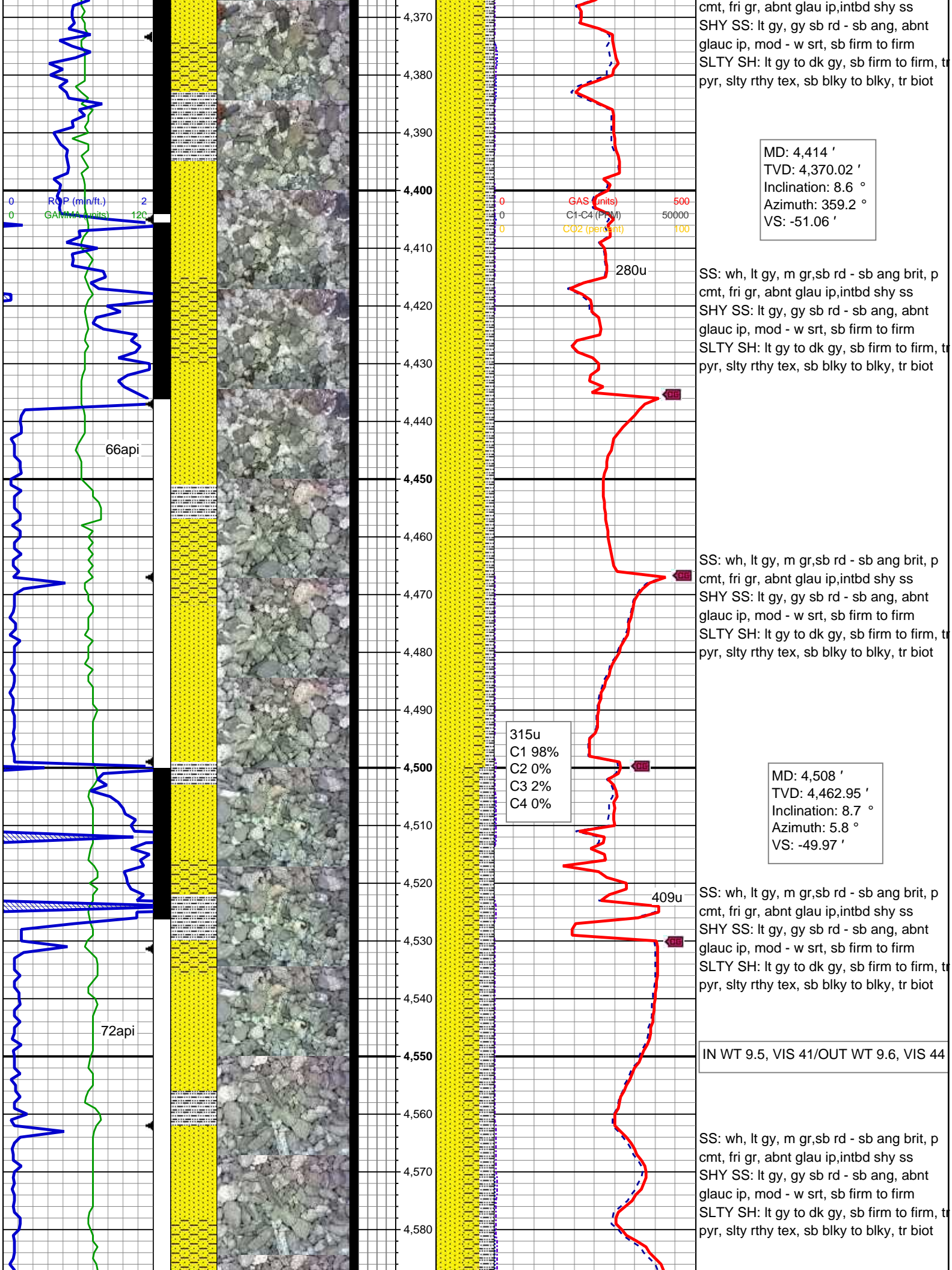
SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr, abnt glau ip, intbd shy ss
 SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr biot

223u

69api

IN WT 9.4, VIS 41/OUT WT 9.5, VIS 42

SS: wh, lt gy, m gr, sb rd - sb ang brit, p



MD: 4,414 '
 TVD: 4,370.02 '
 Inclination: 8.6 °
 Azimuth: 359.2 °
 VS: -51.06 '

SS: wh, lt gy, m gr, sb rd - sb ang brit, p
 cmt, fri gr, abnt glau ip, intbd shy ss
 SHY SS: lt gy, gy sb rd - sb ang, abnt
 glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, t
 pyr, stly rthy tex, sb blkly to blkly, tr biot

SS: wh, lt gy, m gr, sb rd - sb ang brit, p
 cmt, fri gr, abnt glau ip, intbd shy ss
 SHY SS: lt gy, gy sb rd - sb ang, abnt
 glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, t
 pyr, stly rthy tex, sb blkly to blkly, tr biot

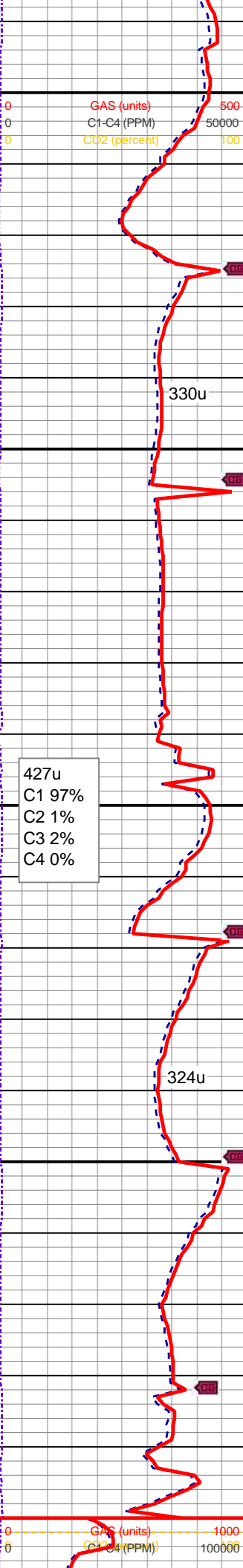
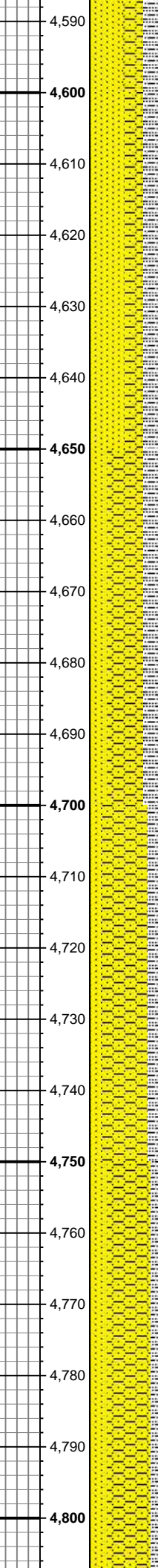
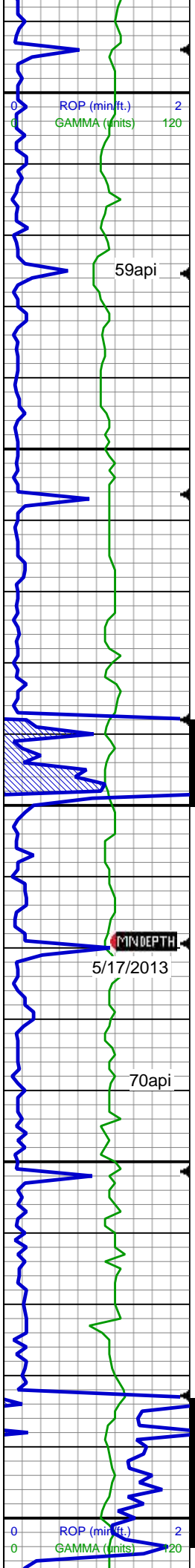
315u
 C1 98%
 C2 0%
 C3 2%
 C4 0%

MD: 4,508 '
 TVD: 4,462.95 '
 Inclination: 8.7 °
 Azimuth: 5.8 °
 VS: -49.97 '

SS: wh, lt gy, m gr, sb rd - sb ang brit, p
 cmt, fri gr, abnt glau ip, intbd shy ss
 SHY SS: lt gy, gy sb rd - sb ang, abnt
 glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, t
 pyr, stly rthy tex, sb blkly to blkly, tr biot

IN WT 9.5, VIS 41/OUT WT 9.6, VIS 44

SS: wh, lt gy, m gr, sb rd - sb ang brit, p
 cmt, fri gr, abnt glau ip, intbd shy ss
 SHY SS: lt gy, gy sb rd - sb ang, abnt
 glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, t
 pyr, stly rthy tex, sb blkly to blkly, tr biot



MD: 4,602 '
 TVD: 4,555.97 '
 Inclination: 7.9 °
 Azimuth: 9.9 °
 VS: -47.7 '

SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr, abnt glau ip, intbd shy ss
 SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, stly rthy tex, sb blkly to blkly, tr biot

330u

SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, stly rthy tex, sb blkly to blkly
 SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr, abnt glau ip

427u
 C1 97%
 C2 1%
 C3 2%
 C4 0%

MD: 4,697 '
 TVD: 4,650.06 '
 Inclination: 7.9 °
 Azimuth: 9.2 °
 VS: -45.11 '

IN WT 9.5, VIS 44/OUT WT 9.6, VIS 45

SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, stly rthy tex, sb blkly to blkly
 SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr, abnt glau ip

324u

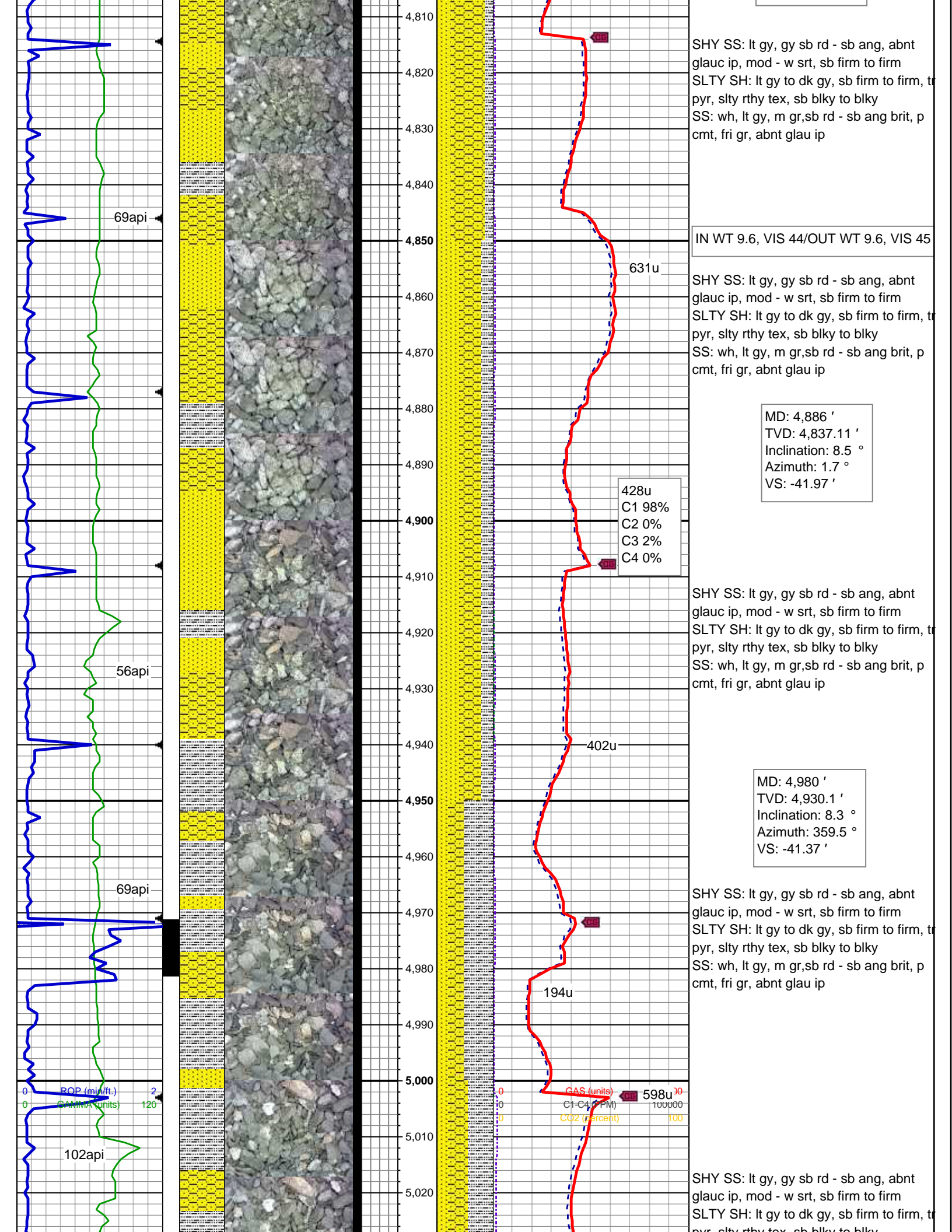
SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, stly rthy tex, sb blkly to blkly
 SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr, abnt glau ip

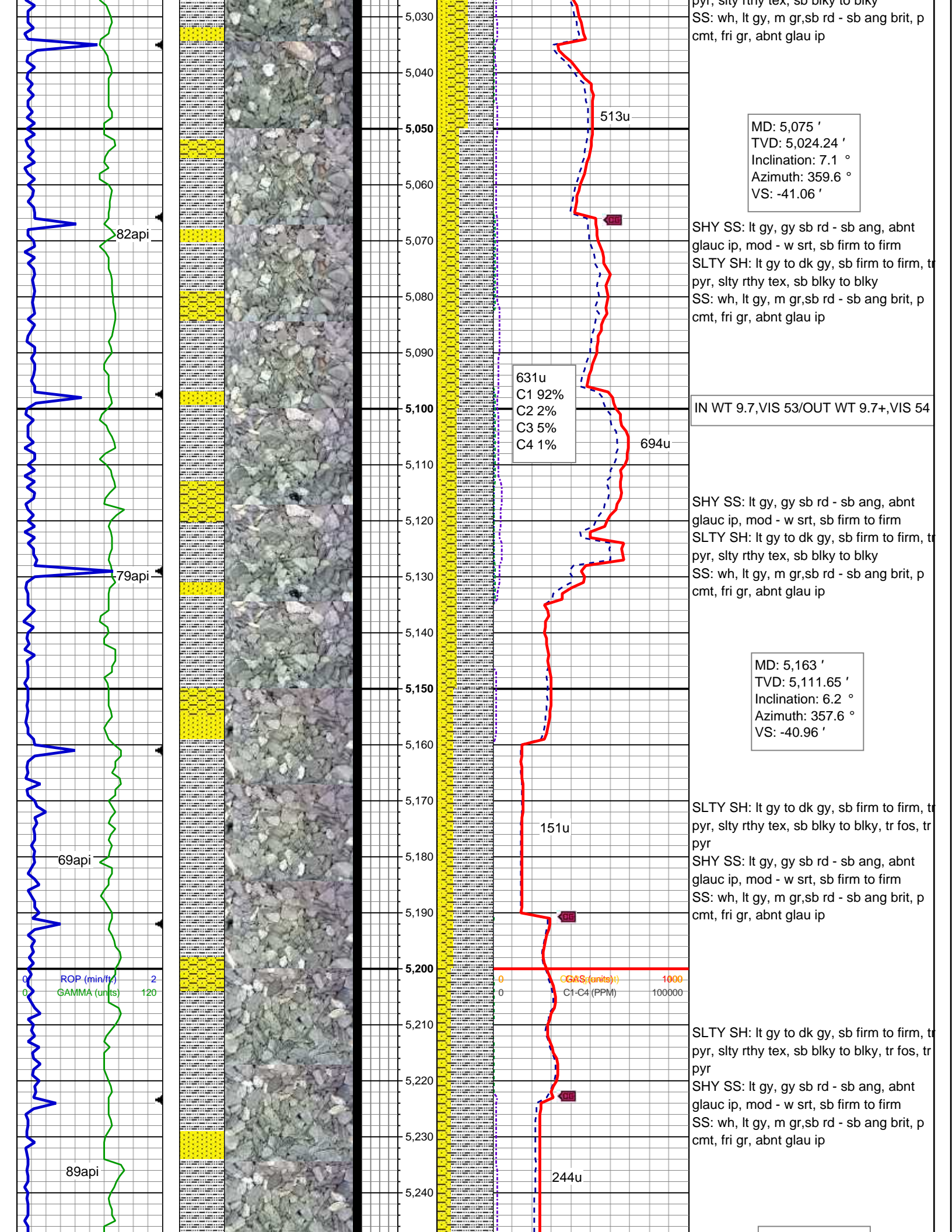
MD: 4,792 '
 TVD: 4,744.12 '
 Inclination: 8.3 °
 Azimuth: 4.2 °
 VS: -43.13 '

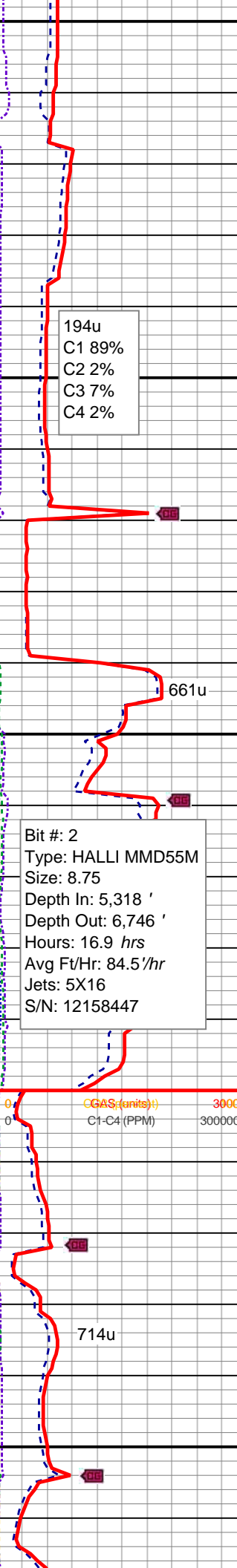
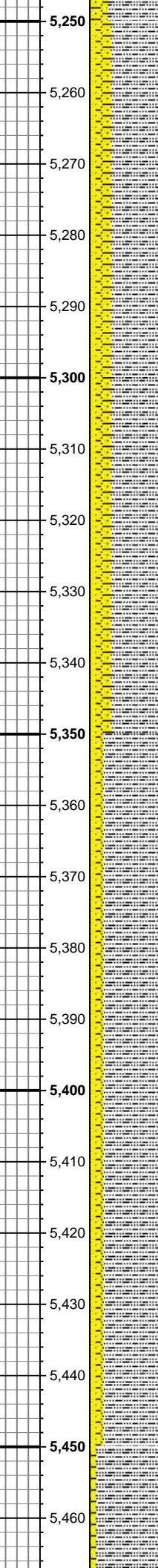
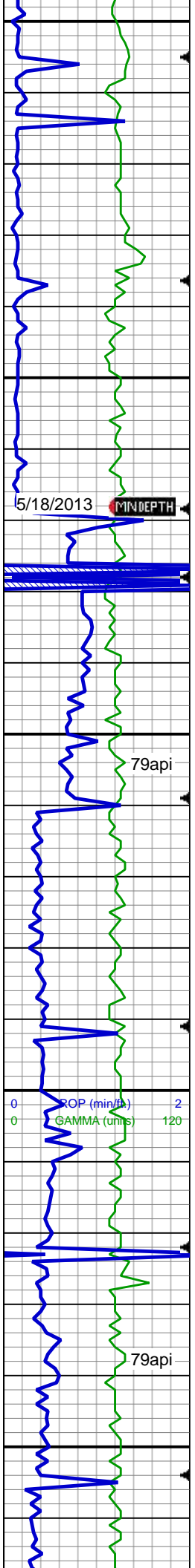
MINDEPTH
 5/17/2013

70api

59api







MD: 5,261 '
 TVD: 5,209.2 '
 Inclination: 4.7 °
 Azimuth: 352.5 °
 VS: -41.4 '

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr
 SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr, abnt glauc ip

IN WT 9.7+, VIS 46

Depth 5318	Gels 20/65	Water 90
MW 9.95	Cake 1	Oil 0
MG 0.5174	pH 7.5	Hard 80
FV 44	Fil 0/1	MBT 40
PV 21	Sand TR	Ch 300
YP 15	Solids 10	LCM 0

194u
 C1 89%
 C2 2%
 C3 7%
 C4 2%

5/18/2013 MINDEPTH

79api

661u

MD: 5,355 '
 TVD: 5,302.94 '
 Inclination: 3.9 °
 Azimuth: 349.8 °
 VS: -42.23 '

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr
 SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr

Bit #: 2
 Type: HALLI MMD55M
 Size: 8.75
 Depth In: 5,318 '
 Depth Out: 6,746 '
 Hours: 16.9 hrs
 Avg Ft/Hr: 84.5/hr
 Jets: 5X16
 S/N: 12158447

ROP (min/ft) 2
 GAMMA (units) 120

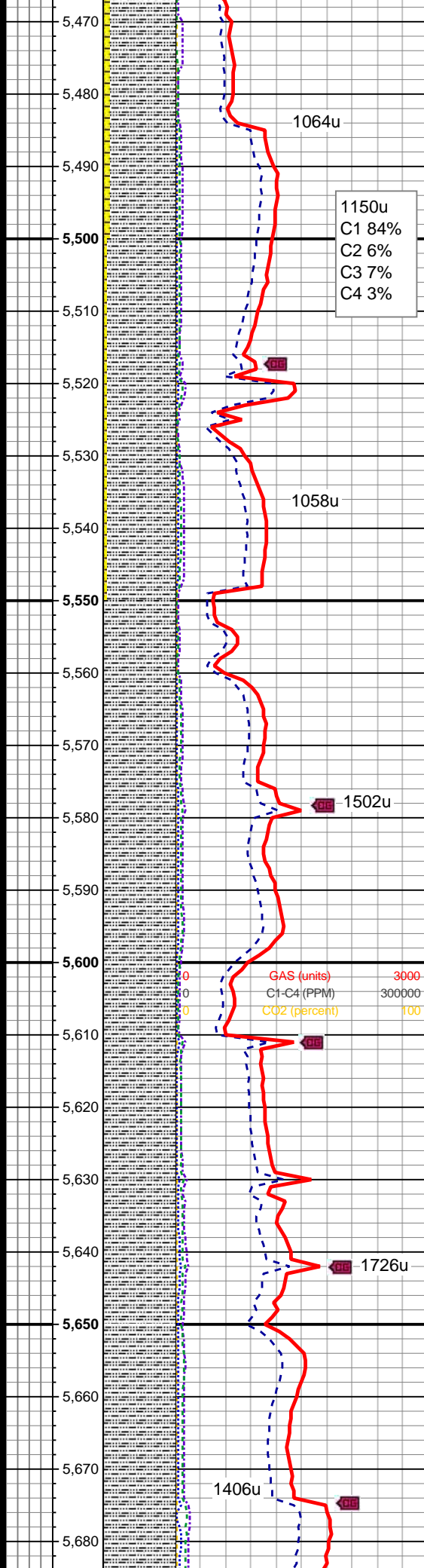
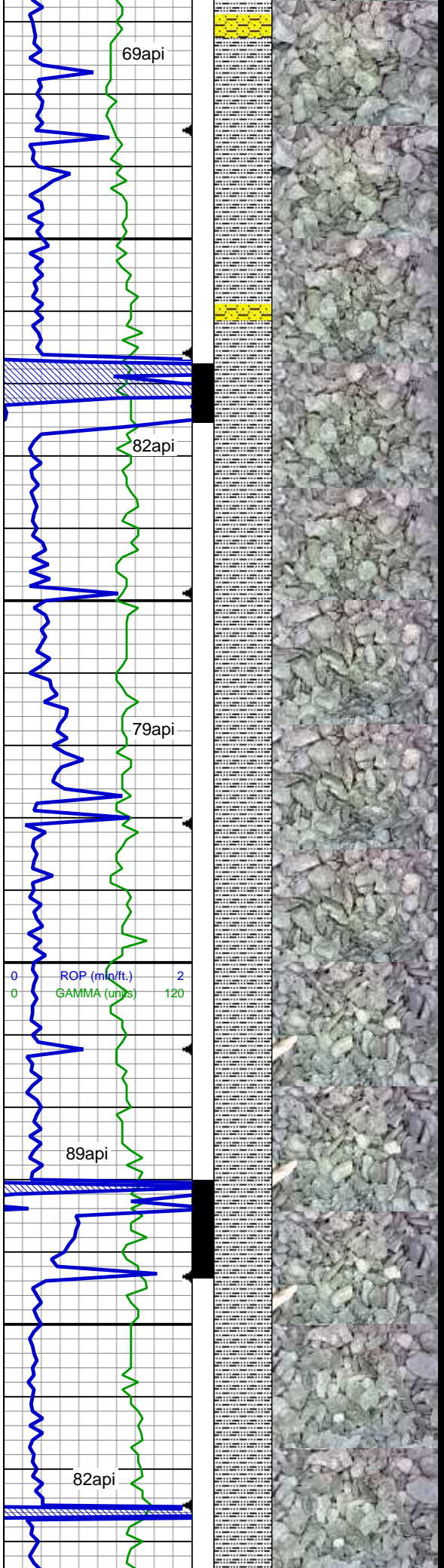
CGAS (units) 3000
 C1-C4 (PPM) 300000

714u

MD: 5,450 '
 TVD: 5,397.74 '
 Inclination: 3.6 °
 Azimuth: 354.3 °
 VS: -42.9 '

IN WT 10.4, VIS 55

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr
 SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm
 SS: wh, lt gy, m gr, sb rd - sb ang brit, p cmt, fri gr



pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr
 SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm

1064u

1150u
 C1 84%
 C2 6%
 C3 7%
 C4 3%

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr
 SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm

MD: 5,544 '
 TVD: 5,491.57 '
 Inclination: 3.2 °
 Azimuth: 353.9 °
 VS: -43.29 '

1058u

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr

IN WT 10.2,VIS 60
 OUT WT 10.2,VIS 76

Depth 5642	Gels 28/38	Water 87
MW 10.2	Cake 1	Oil 0
MG 0.5304	pH 7.1	Hard 80
FV 41	Fil 0/0.85	MBT 50
PV 21	Sand TR	Ch 300
YP 14	Solids 13	LCM 0

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr

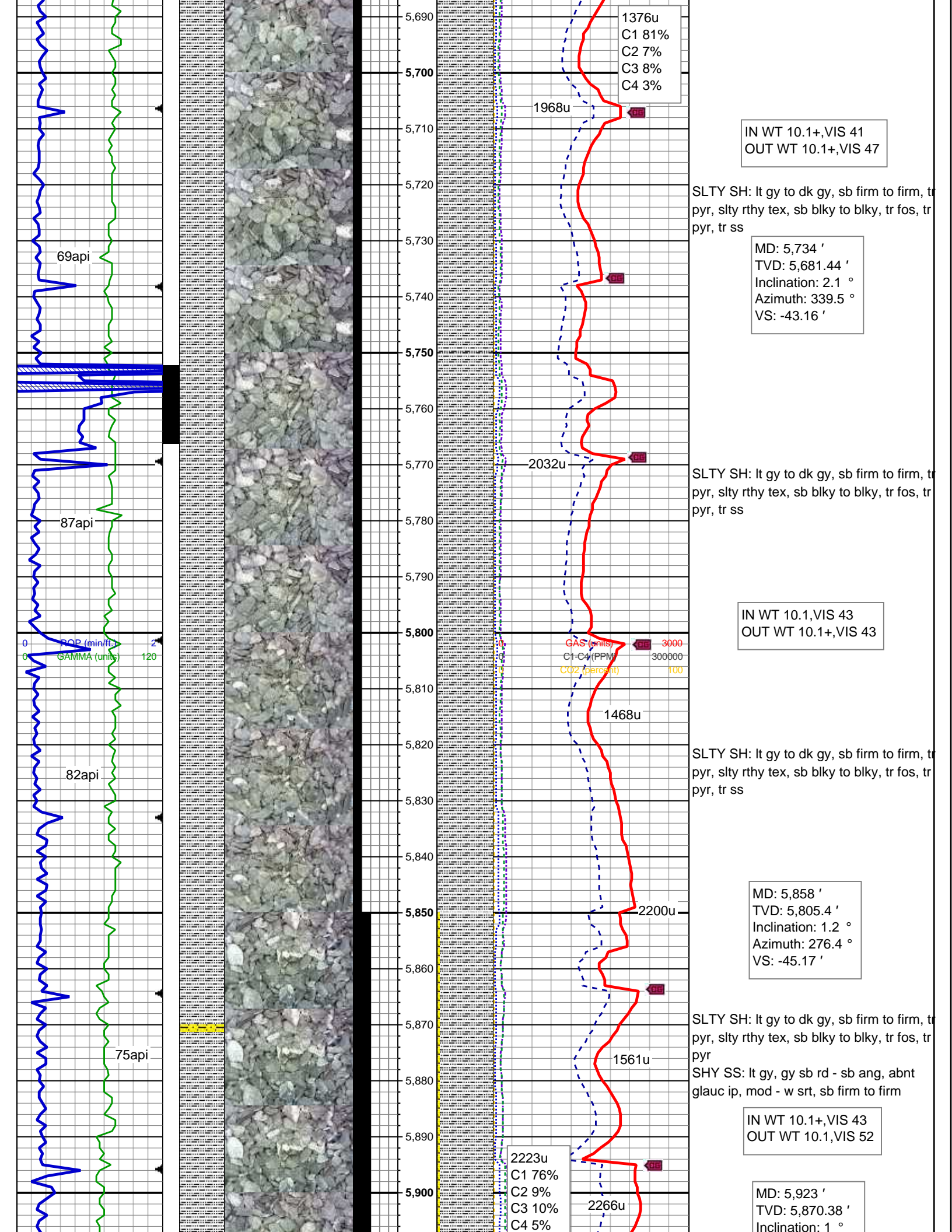
MD: 5,639 '
 TVD: 5,586.49 '
 Inclination: 1.6 °
 Azimuth: 17.4 °
 VS: -43.04 '

IN WT 10.1,VIS 52
 OUT WT 10.1+,VIS 50

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr, tr ss

GAS (units) 3000
 C1-C4 (PPM) 300000
 CO2 (percent) 100

ROP (m/ft) 2
 GAMMA (units) 120



1376u
C1 81%
C2 7%
C3 8%
C4 3%

IN WT 10.1+, VIS 41
OUT WT 10.1+, VIS 47

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr, tr ss

MD: 5,734 '
TVD: 5,681.44 '
Inclination: 2.1 °
Azimuth: 339.5 °
VS: -43.16 '

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr, tr ss

IN WT 10.1, VIS 43
OUT WT 10.1+, VIS 43

GAS (units) 3000
C1-C4 (PPM) 300000
CO2 (percent) 100

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr, tr ss

MD: 5,858 '
TVD: 5,805.4 '
Inclination: 1.2 °
Azimuth: 276.4 °
VS: -45.17 '

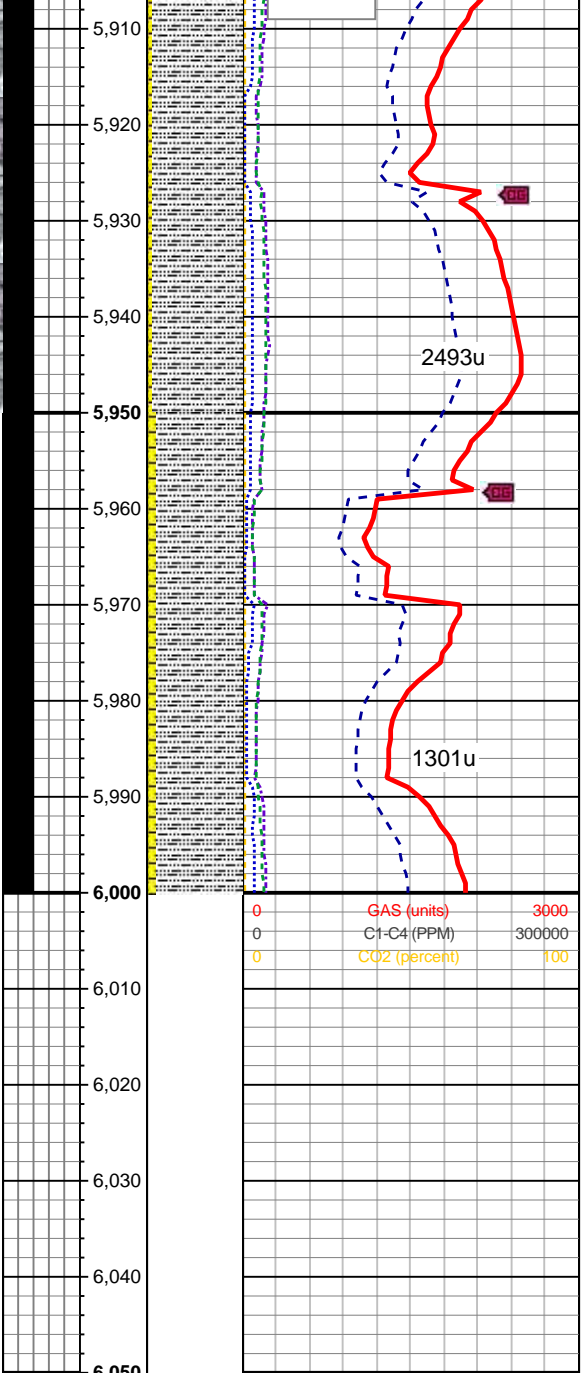
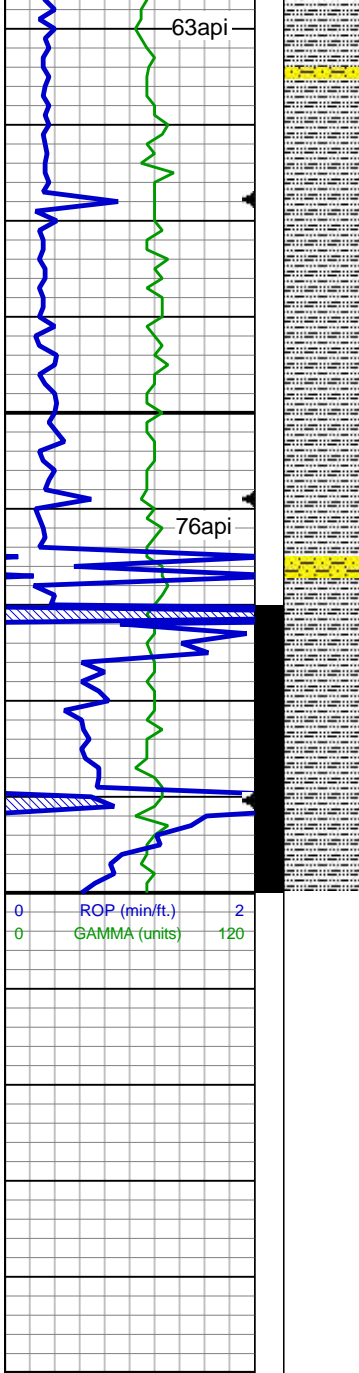
SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr

SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm

IN WT 10.1+, VIS 43
OUT WT 10.1, VIS 52

2223u
C1 76%
C2 9%
C3 10%
C4 5%

MD: 5,923 '
TVD: 5,870.38 '
Inclination: 1 °



Azimuth: 272.2 °
VS: -46.41'

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr

SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm

MD: 5,954'
TVD: 5,901.38'
Inclination: 0.7 °
Azimuth: 272.7 °
VS: -46.87'

SLTY SH: lt gy to dk gy, sb firm to firm, tr pyr, slty rthy tex, sb blkly to blkly, tr fos, tr pyr

SHY SS: lt gy, gy sb rd - sb ang, abnt glauc ip, mod - w srt, sb firm to firm

MD: 5,986'
TVD: 5,933.38'
Inclination: 0.9 °
Azimuth: 271 °
VS: -47.32'

IN WT 10.1,VIS 44
OUT WT 10.0+,VIS 52

Data Continued on Horizontal Log

THANK YOU FOR USING
COLUMBINE LOGGING, INC.